

## **AMENDMENTS TO THE CLAIMS**

The following listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. (Cancelled)

2. (Cancelled)

3. (Currently Amended) The method of claim **9** ~~[[2]]~~, wherein the construction of the entropy-based VOI diagnostic model and the extended VOI diagnostic model are based upon a Bayesian network.

4. (Currently Amended) The method of claim **9** ~~[[2]]~~, wherein the automatically determining includes automatically determining an optimal maintenance action for the mobile platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms.

5. (Currently Amended) The method of claim **9** ~~[[2]]~~, wherein the automatically determining includes automatically prioritizing one or more tests and remedial actions for the mobile platform over multiple stages in accordance with the extended VOI diagnostic model and the one or more observed symptoms.

6. (Currently Amended) The method of claim **9** ~~[[2]]~~, wherein the maintenance action includes at least one of:

- performing a test to refine a prioritization of the plurality of suspect components;

- repairing a suspect component;

- replacing a suspect component;

- deferring maintenance on a suspect component;

- delaying a flight;

- canceling a flight; and

- canceling a flight and replacing the mobile platform.

7. (Previously Presented) A method enabling multistage decision making in preflight dispatch of a mobile platform, the method comprising:

- extending an entropy-based value of information (VOI) diagnostic model to preflight dispatch to accommodate one or more variables associated with preflight dispatch of a mobile platform;

- receiving at least one input relating to one or more observed symptoms indicative of one or more failed components of the mobile platform;

- automatically determining a maintenance action for the mobile platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms;

- wherein the automatically determining includes:

- correlating the at least one input relating to the one or more observed symptoms with one or more suspect components each capable of causing the one or more observed symptoms upon failure in accordance with the extended VOI diagnostic model;

- prioritizing the one or more suspect components based upon a relative likelihood that the respective suspect components caused the one or more observed symptoms;

- identifying and prioritizing one or more tests that can each be performed to refine the prioritization of the one or more suspect components; and

- using the prioritized listing of tests to identify a test to perform or determine that testing should stop.

8. (Currently Amended) The method of claim 9 ~~[[2]]~~, further comprising:

- receiving at least one input relating to an outcome of a test; and

- re-determining the maintenance action in light of the outcome of the test.

9. (Previously Presented) A method enabling multistage decision making in preflight dispatch of a mobile platform, the method comprising:

extending an entropy-based value of information (VOI) diagnostic model to preflight dispatch to accommodate one or more variables associated with preflight dispatch of a mobile platform;

receiving at least one input relating to one or more observed symptoms indicative of one or more failed components of the mobile platform;

automatically determining a maintenance action for the mobile platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms;

receiving at least one input relating to a remedial action undertaken with respect to at least one suspect component; and

re-determining the maintenance action in light of the remedial action.

10. (Currently Amended) The method of claim 9 ~~[[2]]~~, further comprising identifying the one or more variables associated with preflight dispatch.

11. (Currently Amended) The method of claim 9 ~~[[2]]~~, wherein the one or more variables accommodated by the extended VOI diagnostic model include~~[[s]]~~ at least one of:

- a decision parameter;
- a utility function;
- a constraint;
- a cost function;
- a cost limit;
- a time deadline;
- an airworthiness guideline;
- maintenance crew expertise;
- labor availability;
- a future destination of the mobile platform;
- repair equipment availability; and
- component availability.

12. (Currently Amended) The method of claim 9 ~~[[2]]~~, wherein the one or more variables accommodated by the extended VOI diagnostic model include~~[[s]]~~:

- a test decision; and

a repair decision interleaved with the test decision.

13. (Original) The method of claim 12, wherein:

the test decision includes at least one of:

performing a test to refine a prioritization of the plurality of suspect components; and

stopping testing and addressing the repair decision;

the repair decision includes at least one of:

repairing a suspect component;

replacing a suspect component;

deferring maintenance on a suspect component;

delaying a flight;

canceling a flight; and

canceling a flight and replacing the mobile platform.

14. (Previously Presented) A method enabling multistage decision making in preflight dispatch of a mobile platform, the method comprising:

extending an entropy-based value of information (VOI) diagnostic model to preflight dispatch to accommodate one or more variables associated with preflight dispatch of a mobile platform;

receiving at least one input relating to one or more observed symptoms indicative of one or more failed components of the mobile platform;

automatically determining a maintenance action for the mobile platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms;

wherein the one or more variables accommodated by the extended VOI diagnostic model includes a test decision and a repair decision interleaved with the test decision;

wherein the test decision includes at least one of:

performing a test to refine a prioritization of the plurality of suspect components; and

stopping testing and addressing the repair decision;

wherein the repair decision includes at least one of:

repairing a suspect component;

- replacing a suspect component;
- deferring maintenance on a suspect component;
- delaying a flight;
- canceling a flight; and
- canceling a flight and replacing the mobile platform;

wherein the test decision is stopping testing and addressing the repair decision when no test having a positive value of information (VOI) or an estimated time and cost of completion within cost and time constraints prescribed for dispatch of the mobile platform can be identified.

15. (Previously Presented) A method enabling multistage decision making in preflight dispatch of a mobile platform, the method comprising:

- extending an entropy-based value of information (VOI) diagnostic model to preflight dispatch to accommodate one or more variables associated with preflight dispatch of a mobile platform;

- receiving at least one input relating to one or more observed symptoms indicative of one or more failed components of the mobile platform;

- automatically determining a maintenance action for the mobile platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms;

wherein the one or more variables accommodated by the extended VOI diagnostic model includes a test decision and a repair decision interleaved with the test decision;

- wherein the test decision includes at least one of:

- performing a test to refine a prioritization of the plurality of suspect components; and

- stopping testing and addressing the repair decision;

- wherein the repair decision includes at least one of:

- repairing a suspect component;
  - replacing a suspect component;
  - deferring maintenance on a suspect component;
  - delaying a flight;
  - canceling a flight; and
  - canceling a flight and replacing the mobile platform;

wherein the test to perform includes a positive net VOI and an estimated time and cost of completion within cost and time constraints associated with the dispatch of the mobile platform.

16-25. (Cancelled)

26. (Original) A method enabling multistage decision making in a maintenance troubleshooting operation, the method comprising:

- extending an entropy-based value of information (VOI) diagnostic model constructed based upon at least one of systemic information relating to components of a mobile platform and input-output relationships of the components, experience-based information relating to direct relationships between component failures and observed symptoms, and factual information relating to component reliability, the extended VOI diagnostic model accommodating one or more variables associated with the maintenance troubleshooting operation;

- receiving at least one input relating to one or more observed symptoms indicative of one or more failed components of the mobile platform; and

- automatically determining a maintenance action for the mobile platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms.

27. (Original) The method of claim 26, wherein the extending includes extending the entropy-based value of information (VOI) diagnostic model to preflight dispatch to accommodate one or more variables associated with preflight dispatch of the mobile platform.

28. (Original) The method of claim 26, wherein the construction of the entropy-based VOI diagnostic model and the extended VOI diagnostic model are based upon a Bayesian network.

29. (Original) The method of claim 26, wherein the automatically determining includes automatically determining an optimal maintenance action for the mobile

platform in accordance with the extended VOI diagnostic model and the one or more observed symptoms.

30. (Previously Presented) The method of claim 26, wherein the automatically determining includes automatically prioritizing one or more tests and remedial actions for the mobile platform over multiple stages in accordance with the extended VOI diagnostic model and the one or more observed symptoms.

31. (Previously Presented) The method of claim 26, wherein the maintenance action includes at least one of:

- performing a test to refine a prioritization of the plurality of suspect components;
- repairing a suspect component;
- replacing a suspect component;
- deferring maintenance on a suspect component;
- delaying a flight;
- canceling a flight; and
- canceling a flight and replacing the mobile platform.

32. (Previously Presented) The method of claim 26, wherein the automatically determining includes:

- correlating the at least one input relating to the one or more observed symptoms with one or more suspect components each capable of causing the one or more observed symptoms upon failure in accordance with the extended VOI diagnostic model;
- prioritizing the one or more suspect components based upon a relative likelihood that the respective suspect components caused the one or more observed symptoms;
- identifying and prioritizing one or more tests that can each be performed to refine the prioritization of the one or more suspect components; and
- using the prioritized listing of tests to identify a test to perform or determine that testing should stop.

33. (Previously Presented) The method of claim 26, further comprising:  
receiving at least one input relating to an outcome of a test; and  
re-determining the maintenance action in light of the outcome of the test.

34. (Previously Presented) The method of claim 26, further comprising:  
receiving at least one input relating to a remedial action undertaken with respect to at least one suspect component; and  
re-determining the maintenance action in light of the remedial action.

35. (Previously Presented) The method of claim 26, further comprising identifying the one or more variables associated with the maintenance troubleshooting operation.

36. (Previously Presented) The method of claim 26, wherein the one or more variables accommodated by the extended VOI diagnostic model includes at least one of:

- a decision parameter;
- a utility function;
- a constraint;
- a cost function;
- a cost limit;
- a time deadline;
- an airworthiness guideline;
- maintenance crew expertise;
- labor availability;
- a future destination of the mobile platform;
- repair equipment availability; and
- component availability.

37. (Previously Presented) The method of claim 26, wherein the one or more variables accommodated by the extended VOI diagnostic model includes:

- a test decision; and
- a repair decision interleaved with the test decision.



38. (Previously Presented) The method of claim 37:

wherein the test decision includes at least one of:

performing a test to refine a prioritization of the plurality of suspect components; and

stopping testing and addressing the repair decision;

wherein the repair decision includes at least one of:

repairing a suspect component;

replacing a suspect component;

deferring maintenance on a suspect component;

delaying a flight;

canceling a flight; and

canceling a flight and replacing the mobile platform.

39. (Previously Presented) The method of claim 7, wherein the entropy-based VOI diagnostic model is constructed based upon at least one of systemic information relating to components of the mobile platform and input-output relationships of the components, experience-based information relating to direct relationships between component failures and observed symptoms, and factual information relating to component reliability.